Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

Listing of Claims:

~~1. (previously presented)~~ A method of processing a workpiece in a chamber, the method comprising:

(a) using a power supply to form a plasma in the chamber;

(b) treating the workpiece by cyclically and alternately adjusting the processing parameters between at least a first etching step having a first set of processing parameters and a second deposition step having a second set of process parameters; and

(c) compensating for an impedance mismatch between the impedance of the power supply and the impedance of the plasma to stabilize the plasma during at least one of (1) the ~~transition~~ transitions from ~~between~~ the first etching ~~and~~ to second deposition steps and (2) the transitions from the second deposition to first etching steps.

2. (previously presented) A method according to Claim 1, wherein the plasma is stabilized between each cyclic step.

3. (cancelled)

4. (previously presented) A method according to Claim 1, wherein the power supply supplies RF power that is inductively coupled to the plasma.

5. (previously presented) A method according to Claim 1, wherein the plasma is inductively formed by use of a coil which is driven by the power

supply, and wherein the impedance of the plasma is matched with the impedance of the power supply using a matching unit operatively connected between the power supply and the coil.

6. (original) A method according to Claim 5, wherein the matching unit is adjustable manually or electrically.

7. (previously presented) A method according to Claim 5, wherein the plasma impedance is matched to the power supply impedance automatically for at least a part of the time of treatment of the workpiece.

8. (currently amended) A method according to Claim 5, wherein the matching unit is pre-set to act in time at or just before the transition between the first etching and second deposition steps.

9. (previously presented) A method according to Claim 8, wherein automatic matching is enabled when the chamber pressure and/or other parameters have stabilized.

10. (previously presented) A method according to Claim 7, wherein the automatic matching is disabled at or slightly before the transition.

11. (previously presented) A method according to Claim 5, wherein the matching unit is driven by a motor.

12. (original) A method according to Claim 11, wherein control signals are used to drive the motor and are modified to track impedance changes rapidly.

13. (previously presented) A method according to Claim 5, wherein the matching unit comprises capacitors having set initial values for succeeding steps of the same type which are ramped or otherwise adjusted during the overall process.

14. (original) A method according to Claim 13, wherein the initial values for a step of one type are obtained from the values found from automatic matching at the end of the previous step of the same type.

15. (original) A method according to Claim 13, wherein the capacitors in the matching unit are adjusted to different values for each of the steps, and/or the frequency of the power supply is altered, either by a direct command or by an automatic control circuit.

16. (original) A method according to Claim 15, wherein frequency adjustment of the power supply or pre-setting of the frequency for each of the steps to achieve matching of power into a plasma is utilised to reduce or eliminate the need to adjust matching unit capacitor values.

17. (previously presented) A method according to Claim 15, including fixed matching unit capacitor positions, which do not vary between etch and deposition steps, and either a pre-set or automatically adjusted frequency of the RF from the power supply.

18. (previously presented) A method according to Claim 15, including fixing of the matching unit capacitor positions to different appropriate settings for etch and deposition steps, and then either pre-setting or automatically adjusting the frequency of the RF from the power supply.

19. (previously presented) A method according to Claim 1, wherein said compensating for the impedance mismatch includes controlling the pressure in the chamber to inhibit variations in the impedance of the plasma between the first and second steps.

20. (original) A method according to Claim 19, wherein, during a cyclic etch/deposition process, the deposition gas is supplied, or increased in flow rate, before the etch gas is switched off, or reduced in flow rate, and the etch gas is supplied, or increased in flow rate, before the deposition gas is switched off, or reduced in flow rate.

21. (original) A method according to Claim 20, wherein either of the etch or deposition gases are allowed to flow throughout the switched process or for a significant proportion of it.

22. (original) A method according to Claim 21, wherein the deposition gas continues to flow throughout the etch step in addition to the deposition step, but normally at a much reduced rate, while the etch gas is only permitted to flow during the etch step.

23. (original) A method according to Claim 21, wherein the etch gas continues to flow throughout the deposition step in addition to the etch step, but normally at a much reduced rate, while the deposition gas is only permitted to flow during the deposition step.

24. (original) A method according to Claim 21, wherein both etch and deposition gases are allowed to flow simultaneously and continuously.

25. (previously presented) A method according to Claim 20, wherein the respective flow rates of the gases generally vary for each of the steps.

26. (previously presented) A method according to Claim 1, wherein stabilization of the plasma is enhanced by feeding a further gas into the chamber.

27. (original) A method according to Claim 26, wherein the further gas is fed into the chamber by means of a fast acting flow controller.

28. (previously presented) A method according to Claim 26, wherein the further gas is selected from helium, argon or other noble gas, oxygen or nitrogen or a mixture thereof.

29. (previously presented) A method according to Claim 26, further comprising monitoring the pressure in the chamber and adjusting the flow of the further gas accordingly.

30. (previously presented) A method according to Claim 1, wherein the total pressure in the chamber is ramped during a particular step.

31. (previously presented) A method of processing a workpiece in a chamber, the method comprising:

(a) striking a plasma in the chamber;

(b) treating the workpiece by cyclically adjusting the processing parameters between at least a first step having a first set of processing parameters and a second step having a second set of process parameters; and

(c) stabilizing the plasma during the transition between the first and second steps,

wherein stabilization of the plasma is enhanced by substantially preventing or reducing variation of the pressure in the chamber between the first and second steps, and

wherein the chamber is provided with a portion separated from the main part of the chamber by a deflectable member.

32. (original) A method according to claim 31, wherein the separated portion is of a volume which is large compared to the main part of the chamber.

33. (currently amended) A plasma processing apparatus comprising a chamber having a support for a workpiece, power supply means for forming a plasma in the chamber, means for cyclically and alternately adjusting processing parameters between a first etch step and a second deposition step, and means for compensating for an impedance mismatch between an impedance of the power supply means and an impedance of the plasma to stabilize the plasma during at least one of (1) the ~~transition~~ transitions from ~~between~~ the first etching ~~and~~ to second deposition steps and (2) the transitions from the second deposition to first etching steps.

34. (previously presented) A plasma processing apparatus according to Claim 33, wherein the compensating means comprising a matching unit for matching the impedance of the plasma to the impedance of the power supply means.

35. (previously presented) A plasma processing apparatus according to Claim 33, wherein power supply means comprises an RF power supply which generates an RF power signal, and wherein the compensating means comprises means to vary the frequency of the RF power signal.

36. (cancelled)

37. (cancelled)

38. (previously presented) A plasma processing apparatus according to Claim 33, wherein the compensating means inhibits a variation of the pressure in the chamber ~~between the first and second steps~~ during at least one of (1) the transitions from the first etching to second deposition steps and (2) the transitions from the second deposition to first etching steps.